

In short, *Fache et al* cannot be properly combined with *BE '237* because there is no motivation or suggestion to combine, and there is no reasonable expectation of success. The lack of motivation and reasonable expectation of success stems largely from the fact that the adipic acid in *Fache et al* is made from a different process from that of *BE '237*. In *Fache et al*, the adipic acid is made by direct oxidation of cyclohexane with oxygen. See abstract of *Fache et al*. The adipic acid in *BE '237*, on the other hand, is made by an indirect process involving two steps instead of one. In the indirect process, cyclohexane is oxidized with air to form cyclohexanol and cyclohexanone. See lines 18-24 of *BE '237*. The cyclohexanol and cyclohexanone are subsequently oxidized with nitric acid to form adipic acid. As a by-product of the first step, carboxylic acids are formed including adipic acid. It is this adipic acid, from the acid wash liquor, that *BE '237* is directed to improving the purity of.

The two processes for making adipic acid are recognized to be quite different. For example, in U.S. Patent No. 5,877,341, it is said that "The Direct Synthesis Process has been given attention for a long time. However, to this date it has found little commercial success. One of the reasons is that although it looks very simple at first glance, **it is extremely complex in reality.**" Col. 1, lines 43-49 (emphasis added) (attached). Notable differences between the two processes include the use of different catalysts and the use or lack of use of solvents. The direct oxidation process requires a carboxylic acid solvent such as acetic acid while the indirect process does not. Further, the direct oxidation process uses cobalt, copper, and/or manganese **acetates** as catalyst while the indirect

process uses cobalt **naphthenate**. See H.C. Ries, SRI Report No. 3, *Adipic Acid* at 37 (attached).

Because of the recognized differences between the two processes for making adipic acid, persons skilled in the art would not have been motivated to employ the techniques associated with one in the other. Nor would persons skilled in the art have a reasonable expectation of success in doing so.

Applicants note the Examiner's assertion that it would have been obvious to combine *BE '237* with *Fache et al* to further improve the purity of the desired product. However, this rationale is flawed for two main reasons. First, *Fache et al* does not express a need to further improve the purity of its product. And the Examiner has not presented any evidence indicating that the purity achieved by *Fache et al* is less than desirable. See col. 5, lines 53-60 of *Fache et al*. Second, there is no basis to believe that the *BE '237* treatment would actually improve the purity of the *Fache et al* product. After all, the *Fache et al* product is made by a different process and the liquor within which it sits has different components than that of *BE '237*. As a result, there is a lack of proper motivation or suggestion to combine *Fache et al* with *BE '237*.

Even if the hypothesized combination were proper, which it is not, the combination would still not have led persons skilled in the art to arrive at the claimed invention. For example, instant claim 1 provides that the catalyst is separated from the distillation bottoms (step (c)) before the distillation bottoms, containing the adipic acid, is purified by reduction or oxidation (step (d)) and before crystallization (step (e)). In contrast to the present invention, *Fache et al* teaches crystallizing the adipic acid before separating the catalyst

from the aqueous solution. See col. 3, lines 30-47. *BE* '237 does not remedy this deficiency of *Fache et al* because it does not mention separating catalyst from the liquid containing the adipic acid before crystallizing and purifying the adipic acid by oxidation/reduction. Accordingly, even if the references could properly be combined, the combination would still not have rendered the claimed invention obvious to persons skilled in the art.

For at least all of the reasons set forth above, the applied references cannot be properly combined. Even if they could, the combination would still not disclose or suggest each of the features of the presently claimed invention. Therefore, there is no *prima facie* case of obviousness, and the rejections under 35 U.S.C. § 103(a) should be withdrawn.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

If the Examiner has any questions concerning this Reply, or the application in general, the Examiner is invited to telephone the undersigned at the number listed below.

Respectfully submitted,

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